Design and Implementation of a Multi-Grid Resource Broker for Grid Computing

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Grid computing enables users to unite pools of servers, storage systems and networks into one large system which can deliver quality service. To an end user or application, it looks like one big virtual computing system with huge processors, memory, and storages. Grid technology allows organizations to use numerous computers to solve problems by sharing computing resources. The problems to be solved might involve data processing, network bandwidth, or data storage. A single grid often not provide a huge resource, because virtual organizations have no the adequate of computing resources restriction on the scale of organizations. Also, a Grid is a dynamic environment in which resources join and leave the Grid constantly. Moreover the performance of the various resources keeps changing. So it is difficult to get repeatable results in a Grid environment. In this paper, we propose a new grid architecture, which integrates multiple computational grids, named Multi-Grid, from different virtual organizations. We developed an algorithm to broker the resources for Tightly Coupled and Loosely Coupled applications in a multi-Grid environment. We build a resource broker on multiple grid environments, which integrates a number of single grids from different virtual organizations without the limited of organizations. We can efficiently use the multiple grid resources avoid waste of resource. In addition, we proposed a Multi-Grid Resource Selection Strategy for the resource broker to select the better allocation of resource before submitting job avoid network congestion caused of decrease of performance.